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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/810,463	03/26/2004	Raj M. Deshpande	03108/0201077-US0	9325

7278 7590 06/08/2005

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EXAMINER	
WITHERSPOON, SIKARL A	
ART UNIT	**PAPER NUMBER**
1621	

DATE MAILED: 06/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/810,463	DESHPANDE ET AL.	
	Examiner	Art Unit	
	Sikarl A. Witherspoon	1621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 November 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11/9/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

S.S.S.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paciello et al (US 5,689,010) and Merger et al (US 4,408,079) in combination.

The instant claims are drawn to a process for the synthesis of alpha-substituted acrolein by hydroformylation of an olefin in the presence of a catalyst comprising a rhodium complex, and simultaneously subjecting the aldehyde produced by the hydroformylation to an aldol condensation with formaldehyde, in the presence of an aldolisation catalyst comprising a secondary amine or secondary amine/organic acid catalyst in the aqueous phase, wherein the two reaction are conducted in a biphasic aqueous organic system. The organic phase comprises organic media selected from aromatic hydrocarbons, aliphatic hydrocarbons, higher alcohols, and mixtures thereof.

Paciello et al teach a process for making higher aldehydes by hydroformylation and aldol condensation of an olefin in the presence of a hydroformylation catalyst based on rhodium or cobalt with simultaneous use of a Mannich catalyst comprising secondary amines and carboxylic acids. The secondary amine compound may be di-n-decylamine, piperidine, dibenzylamine, and the like; the acid component can be compounds such as acetic acid and tridecanoic acid (col. 2, lines 20-67). Rhodium-

carbonyl-phosphine complexes are used as the hydroformylation catalyst, at a molar ratio of phosphine to rhodium of from 1: 1 to 1000:1. A solvent that is inert is used, such as an alcohol having 1 to 20 carbon atoms. The conversion of the olefins to aldehydes takes place at from 30 to 150° C and a pressure from 0.01 to 100 bar, or 0.15 to 1450 psi; alpha-olefins having 3 to 20 carbon atoms, in particular, propylene, butanes or pentenes are preferred as starting material (col. 3, lines 1-37).

The differences between Paciello et and the present invention are that Paciello et al do not expressly state that simultaneous hydroformylation and aldol condensation take place in a biphasic system, do not teach the condensation of formaldehyde with the aldehyde formed by the hydroformylation (to produce an acrolein compound), and do not teach carrying out the hydroformylation with a rhodium catalyst precursor with an additional ligand, as claimed in the present invention.

Regarding the first difference, although Paciello et al do not expressly recite a biphasic system being employed, the reference teaches that a solvent such as a higher alcohol is employed. A person of ordinary skill in the art would have recognized that the catalyst used for hydroformylation and the catalyst used for the aldol condensation are incompatible with each other. Therefore, it would have been obvious to a person of ordinary skill that the solvent is employed in order to create a biphasic system that would allow the two processes, i.e., hydroformylation and aldol condensation, to occur simultaneously with out adverse effects on the catalysts.

With regard to the second difference, Merger et al teach a process for the preparation of alpha-alkylacroleins by aldol condensation of an alkanal with

formaldehyde, in the presence of a secondary amine and an acid. The alkanal can be reacted with formaldehyde in stoichiometric amount, in less than this amount, or in excess, for example, in an amount from 0.9 to 1.5 moles of starting material per mole of formaldehyde (col. 3, lines 35-65, and col. 4, lines 30-40).

Since Paciello et al teach, or appear to teach the aldol condensation of the aldehyde(s) formed from the hydroformylation therein, and not a cross-aldol condensation of the aldehyde formed therein with formaldehyde, the examiner purports that it would have been obvious to a person of ordinary skill in the art, at the time the present invention was made, to combine the simultaneous hydroformylation/aldol condensation taught by Paciello et al, with the process for making alpha-substituted acroleins taught by Merger et al, wherein a person of ordinary skill in the art would have modified Paciello et al to include a cross-aldol condensation of the aldehyde(s) formed therein, with formaldehyde. Alpha-substituted acroleins are known in the art to be useful starting materials for dyes, drugs, and pest control agents. A person of ordinary skill in the art would have recognized that alkylacroleins, such as methacrolein is produced from a cross-aldol condensation with formaldehyde. Therefore, a person of ordinary skill in the art would have been motivated to combine the two reference teachings by the desire to convert the aldehyde(s) formed during the hydroformylation/aldol condensation taught by Paciello et al to the useful alkyl-acrolein compounds.

With regard to the hydrofomylation being carried out using a rhodium catalyst precursor with an additional ligand, the examiner takes the position that it is immaterial,

absent a showing of unexpected results, whether or not a catalyst precursor, that may form the active catalytic species in situ, or the actual active rhodium-complex catalyst is employed. A person of ordinary skill would reasonably expect the hydroformylation to occur in either case.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sikarl A. Witherspoon whose telephone number is 571-272-0649. The examiner can normally be reached on M-F 8:30-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Johann Richter can be reached on 571-272-0646. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sikarl A. Witherspoon

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Patent Examiner
Technology Center 1600